

REMARKS

Claims 72, 75, and 85 have been amended for clarification purposes. Support for the amendments can be found, for example, in Figures 1 and 4. Claims 72-79, 81-91, 93, and 94 are currently pending.

Claim Rejection – 35 U.S.C. §102

Claims 72, 78, 79, 81, and 83 were rejected under 35 U.S.C. §102(a) as allegedly anticipated by Collins et al. (U.S. Patent No. 5,556,501) ("Collins").

Applicants respectfully traverse this rejection.

As stated in MPEP § 2131, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Claim 72, as amended, recites, *inter alia*, a substantially planar electrically-conductive coil extending across the planar dielectric window, which inductively couples RF energy into the plasma processing chamber through the planar dielectric window and energizes the process gas into a plasma state, a substrate support mounted in the chamber below the dielectric window and having a support surface facing the dielectric window, the support surface adapted to support a substrate within the processing chamber, the support surface lying in a plane parallel to the planar dielectric window; and a plurality of injector tubes (emphasis added).

Applicants respectfully submit that each and every element set forth in independent Claim 72 is not found in Collins. First, Collins discloses a wafer support electrode 32C to support wafer 5 (column 8, lines 45-47; Figure 1). Collins further

discloses a helical antenna **30** with multiple turn configuration (column 8, lines 4-7) which surrounds a tubular (open-ended cylinder) dielectric dome (column 4, lines 12-15), which extends perpendicularly to the wafer support surface of electrode **32C**. Furthermore, from Figure 1 of Collins, wafer support electrode **32C** does not face dielectric dome **17W**. Second, Collins discloses gas injection through "stepped sintered ceramic porous gas diffuser plugs **54-54**" (column 10, lines 10-11; Figure 2), rather than injector tubes, as recited in Claim 72. Thus, Collins does not disclose each and every element as set forth in independent Claim 72. As such, Applicants respectfully request withdrawal of the rejection of Claim 72 under 35 U.S.C. § 102(a). Dependent Claims 78, 79, 81, and 83 are also patentable over Collins at least for the same reasons as those discussed above regarding Claim 72.

Claim Rejections – 35 U.S.C. §103

A. Legal Standard for Obviousness

As stated in MPEP § 2143, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim features. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The mere fact that references can be combined or modified does not render

the resultant combination obvious unless the references also suggest the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, as stated in MPEP § 2143.01 (V), if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

B. Claims 73-77 and 82

Claims 73-77 and 82 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Collins, in view of Latz et al. (U.S. Patent No. 5,169,509) ("Latz"). Applicants respectfully traverse this rejection.

Claim 73 depends from Claim 72 and recites, *inter alia*, that at least some of the injector tubes are oriented in the plasma processing chamber to direct the process gas along the axes thereof that intersect an exposed surface of the substrate at an acute angle when the substrate is supported on the substrate support (emphasis added).

The Official Action acknowledges that Collins does not teach the features of Claims 74, 76, 77, and 82, but cites Latz to allegedly cure these deficiencies (Official Action at pages 5-9). However, Latz fails to cure the above noted deficiencies of Collins regarding Claim 72. Furthermore, Latz discloses that "[c]oating chamber 15 ... is provided with a gap or slot 6 through which the process gas [is supplied] from distributing line 24" (emphasis added) (column 3, lines 5-6) rather than injector tubes, as recited in Claim 73. Accordingly, as Collins fails to show the combination of features recited in Claim 72 and Latz fails to show injector tubes, Applicants

respectfully submit that Claims 74, 76, 77, and 82 are clearly patentable over the applied references.

Independent Claim 75, as amended, recites the above discussed features of Claim 72 missing from Collins, *inter alia*, a substantially planar electrically-conductive coil extending across the planar dielectric window, which inductively couples RF energy into the plasma processing chamber through the planar dielectric window and energizes the process gas into a plasma state and a substrate support mounted in the chamber below the dielectric window and having a support surface facing the dielectric window, the support surface adapted to support a substrate within the processing chamber, the support surface lying in a plane parallel to the planar dielectric window; and a plurality of injector tubes (emphasis added).

The Official Action acknowledges that Collins does not disclose all of the features of independent Claim 75 and cites Latz to allegedly cure the deficiencies of Collins (Official Action at pages 5-8). However, as discussed above regarding Claim 72, Collins does not disclose the combination of features recited in Claim 72 which includes at least the claim feature of a substrate support lying in a plane parallel to the dielectric planar window or a substrate support facing the dielectric planar window or injector tubes. Moreover, Latz fails to cure the above-noted deficiencies of Collins. Accordingly, Applicants submit that Claim 75 is patentable over the applied references for at least the same reasons as those discussed above regarding Claim 72.

Because a *prima facie* case of obviousness has not been established, Applicants respectfully request withdrawal of the rejection of Claims 73-77 and 82 under 35 U.S.C. § 103(a).

C. Claim 84

Claim 84 (which depends from Claim 72) was rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Collins, in view of Chen (U.S. Patent No. 5,691,876) ("Chen"). Applicants respectfully traverse this rejection.

The Official Action acknowledges that Collins does not teach the feature of the substrate support including means for maintaining the substrate at a desired temperature when the substrate is supported on the substrate support as recited in Claim 84, but cites Chen to allegedly cure this deficiency (Official Action at page 9, ¶ 3). However, Chen fails to cure the above-noted deficiencies of Collins regarding Claim 72. Accordingly, Applicants submit that Claim 84 is patentable over the applied references for at least the same reasons as those discussed above regarding Claim 72.

Because a *prima facie* case of obviousness has not been established, Applicants respectfully request withdrawal of the rejection of Claim 84 under 35 U.S.C. § 103(a).

D. Claims 85-91 and 93

Claims 85-91 and 93 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Collins, in view of Chen and Latz. Applicants respectfully traverse this rejection.

Independent Claim 85, as amended, recites the above discussed features of Claim 72 missing from Collins, *inter alia*, a substantially planar electrically-conductive coil extending across the planar dielectric window, which inductively couples RF energy into the plasma processing chamber through the planar dielectric window and energizes the process gas into a plasma state and a substrate support mounted in

the chamber below the dielectric window and having a support surface facing the dielectric window, the support surface adapted to support a substrate within the processing chamber, the support surface lying in a plane parallel to the planar dielectric window; and a plurality of injector tubes (emphasis added).

The Official Action acknowledges that Collins does not disclose all of the features of independent Claim 85 and cites Chen and Latz to allegedly cure the deficiencies of Collins (Official Action at pages 11-15). However, as discussed above regarding Claim 72, Collins does not disclose at least the claim feature of a substrate support lying in a plane parallel to the dielectric planar window or a substrate support facing the dielectric planar window or injector tubes. Moreover, Chen and Latz fail to cure the above-noted deficiencies of Collins. Accordingly, Applicants submit that Claim 85 is patentable over the applied references for at least the same reasons as those discussed above regarding Claim 72. Dependent Claims 86-91 and 93 are also patentable over the applied references for at least the same reasons as those discussed above regarding Claim 72.

E. Claim 94

Claim 94 (which depends from Claim 72) was rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Collins in view of Ishii (U.S. Patent No. 5,571,366) ("Ishii"). Applicants respectfully traverse this rejection.

The Official Action acknowledges that Collins does not disclose all of the features of independent Claim 94 and cites Ishii to allegedly cure the deficiencies of Collins (Official Action at page 16). However, as discussed above regarding Claim 72, Collins does not disclose at least the claim feature of a substrate support lying in a plane parallel to the dielectric planar window or a substrate support facing the

dielectric planar window or injector tubes. Moreover, Ishii fails to cure the above-noted deficiencies of Collins.

Furthermore, Applicants respectfully submit that the proposed modification of Collins (i.e., substitution of Ishii's planar electrically-conductive coil in Collins' apparatus) would render the apparatus of Collins unsatisfactory for its intended purpose. Collins' antenna **30** is a three-dimensional coil (column 8, lines 4-7; Figure). Collins discloses that "[t]he plasma is generated in the dome **17** concentrated in the small volume defined within the coil antenna **30**" (column 8, lines 59-61) and "antenna **30** is positioned outside and adjacent the dome **17** and the plasma chamber **16A** for coupling the RF electromagnetic (em) energy into the source chamber **16A** to induce electric fields in the process gas." In other words, Collins' coil shaped antenna **30** is configured to a specific geometry, such that electromagnetic energy forms a plasma within the interior of the coil. In sharp contrast, Ishii's radio frequency antenna **6** is a planar electrically-conductive coil (Figure 2). Thus, incorporating Ishii's planar electrically-conductive coil **6** into Collins' dome **17** would render Collins unsatisfactory for its intended purpose, because Collins' three-dimensional coil antenna **30** has a specific geometric configuration to generate a plasma within the interior of the coil. As stated in MPEP § 2143.01 (V), if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Accordingly, Applicants submit that Claim 94 is patentable over the applied references for at least the same reasons as those discussed above regarding Claim 72.


Conclusion

For at least the foregoing reasons, Applicants respectfully submit that all pending claims are allowable, and this application is in condition for allowance. Accordingly, Applicants request a favorable examination and consideration of the instant application. Should Examiner Zervigon wish to discuss this application, Applicants request that the undersigned be contacted at the number below.

Respectfully submitted,

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